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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,188	09/09/2003	Joseph E. Legare	Legare-PAUS0004	1617

58937 7590 01/25/2010

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EXAMINER	
NGUYEN, TU MINH	
ART UNIT	PAPER NUMBER
3748	
MAIL DATE	DELIVERY MODE
01/25/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/657,188	LEGARE, JOSEPH E.	
	Examiner	Art Unit	
	TU M. NGUYEN	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. An Applicant's Amendment filed on November 17, 2008 and March 16, 2009 have been entered. Claims 14, 15, and 17-20 have been amended. Overall, claims 1-24 are pending in this application.

Based on a personal interview conducted on August 4, 2009, the Requirement for Restriction/Election filed on July 9, 2009 is hereby withdrawn; and claims 1-24 will be examined in its full merit.

Applicant's argument that Akazaki et al. fail to disclose or teach the use of a switching oxygen sensor and that they do not teach the use of oxygen storage for air-fuel ratio control, is persuasive; therefore, a new non-final rejection is set forth below.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maki et al. (U.S. Patent 5,606,959) in view of Bush et al. (U.S. Patent 5,842,340).

Re claims 1, 3, 4, 6, 7, 9, 12-14, and 16-24, as shown in Figures 1-17, Maki et al. disclose a method of individual cylinder fuel control compensation for conditions of engine load changes, including the steps of:

- providing a catalyst (28) for reducing exhaust gas emissions;

- monitoring engine exhaust gases with a wide-range oxygen sensor (54);

- detecting at least one engine operating parameter (manifold pressure Pb) indicating a load change and enabling individual cylinder fuel control, during a first time period (as indicated in the Abstract and shown in Figures 16-17, a "gain matrix" is determined based on a manifold pressure Pb; and a convergence speed of an air-fuel feedback control based on a signal of the oxygen sensor is adjusted based on the "gain matrix");

- enabling a change in fuel quantity, to at least one selected individual cylinder, to produce a change in exhaust gases' air-fuel conditions that adjusts for effects of the load change;

- detecting exhaust gases' conditions resulting from each the selected individual cylinders' the change in fuel quantity by sampling at predetermined times; and

- controlling subsequent changes in cylinder's fuel quantity, such changes depending on effects that each previous the change in fuel quantities has on subsequent exhaust gases' air-fuel conditions detected for each individual cylinders' combustion event, to causing in cycling of gases' air-fuel about a defined control point so as to compensate air-fuel conditions for the load changes, wherein the changes in fuel quantity are determined using stored correction values based upon oxygen sensor feedback during prior engine load changes of similar characteristics, such the feedback from subsequent prior combustion events having the fuel quantity causing the

cycling of gases' air-fuel about a defined control point (see at least Figurers 6-7, 10, and 12 and the corresponding text).

Maki et al., however, fail to disclose that instead of a wide-range oxygen sensor, the exhaust gases' conditions are detected with a switching-type oxygen sensor; and that the cycling of gases' air-fuel about a defined control point is used to determine dynamic catalyst oxygen storage characteristics during non-stoichiometric conditions for modifying subsequent fuel changes into the individual cylinders for more quickly reaching the defined control point .

As shown in Figure 1, Bush et al. disclose a method for controlling a level of oxygen stored in a catalytic converter for an exhaust system comprising a catalytic converter (34), an upstream switching-type oxygen sensor (28), and a downstream switching-type sensor (30). As depicted in Figures 4-5 and indicated on line 46 of column 10 to line 7 of column 11, Bush et al. teach that it is conventional in the art to utilize the switching-type oxygen sensors (28, 30) to detect exhaust gases' conditions (rich or lean) and employs the signals from the sensors to control an engine air-fuel ratio to achieve high purification efficiency at the catalytic converter by controlling a dynamic catalyst oxygen storage characteristics during non-stoichiometric conditions. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Bush et al. in the method of Maki et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to effectively control an engine air-fuel ratio for optimum purification efficiency of a catalyst.

Re claims 2 and 15, the modified method of Maki et al. further comprises the step of determining an oxygen sensor time response characteristics for assessing proper operating

condition of the oxygen sensor using the time delay period stored in memory (see at least Figure 6 and the corresponding text).

Re claims 5 and 11, as taught by Bush et al., the oxygen sensor detecting exhaust gases' conditions in the modified method of Maki et al. is a switching type sensor having two discrete output voltage characteristics for conditions richer and leaner than stoichiometric.

Re claim 8, in the modified method of Maki et al., the change in fuel quantity is implemented gradually by transitioning to the maximum controlled fuel quantity changes amongst individual cylinders spanning over a number of cylinder firing events in order to minimize perceived changes in engine smoothness caused by step changes in engine cylinders' torque levels.

Re claim 10, in the modified method of Maki et al., the changes in fuel quantity are determined using stored correction values based upon oxygen sensor feedback during prior engine load changes of similar characteristics, such said feedback from subsequent prior combustion events having said fuel quantity causing said cycling of gases' air-fuel about a defined control point.

Response to Arguments

4. Applicant's arguments with respect to the references applied in the previous Office Action have been considered but are moot in view of the new ground(s) of rejection.

Communication

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Tu M. Nguyen/

TMN

Tu M. Nguyen

January 15, 2010

Primary Examiner

Art Unit 3748